

separated from the latter at a period when the connection between the Aral-Caspian depression and the Arctic Ocean still existed. There was certainly, in recent geological time, a connection between the rivers of the Balkhash basin and those of the Lobnor basin, which connection probably followed the Kunges, the Yulduz, and the Tarim Rivers.

THE total area of the Crown forests of Sweden at the beginning of 1885 was 5,785,535 hectares, being a seventh part of the total forest area of the country. The revenue from the same was a little less in 1885 than in 1884, but this is believed to be only incidental, it having risen from 750,000*l.* in 1880 to 890,000*l.* in 1882, and 1,120,000*l.* in 1884.

WE have received part 2, vol. iv. of the *Transactions* of the Norfolk and Norwich Naturalists' Society, containing the papers selected for publication and the address read by the President, Major Feilden, F.G.S., at the seventeenth annual meeting of the Society. From the report it appears that the Society now numbers 260 members, and is both numerically and financially in a very satisfactory condition. For his address Major Feilden chose the fascinating problem of the origin of life, which he strove to show must have had its advent at the poles of the earth, a subject which his study of the fossil and recent fauna of the polar regions as naturalist to the Arctic Expedition of 1875-76 gave him special opportunities of studying. The conclusions to which Major Feilden arrives are that through the secular cooling of our planet the poles became first fitted for the reception of life; that in palæozoic times the North Pole possessed a climate as warm, at least, as that now enjoyed at the equator; that the temperature at the North Pole during the Miocene period, though gradually cooling, supported a flora which spread southwards; and that in all probability animal life likewise originated at the poles, and spread towards the equator. Amongst the published papers, one by Mr. Clement Reid, F.G.S., on the "Flora of the Cromer Forest Bed," is of especial interest. Mr. Reid enumerates sixty species of plants, which he has obtained by the careful washing of clays from various localities near Cromer, and calls attention to the curious fact that all these, with the exception of *Trapa natans*, three firs, and *Isotria lacustris*, are still indigenous to the county of Norfolk, and two-thirds of them are aquatic or marsh plants, identical in species with those found at the present day in almost all the Norfolk morasses. Mr. Edward Bidwell contributes an account of a visit to the Isles of Scilly in the nesting season of 1885; the Rev. H. A. Macpherson a paper on the habits and plumage of the Manx shearwater; Mr. G. Smith some notes on the habits of the Fulmar petrel; meteorological notes by Mr. A. W. Preston; notes on the herring fishery of 1885, by Mr. Southwell; a second paper, by Mr. Reid, on Norfolk amber; and a list of the birds of Norfolk, with remarks, by Messrs. Godney and Southwell; also a valuable paper on the gradual assumption of the adult plumage in the honey buzzard, by Mr. J. H. Godney.

WE have received a "Liste Alphabétique" of the Correspondence of Christian Huygens, which the Dutch Society of Sciences proposes to publish. The list may be obtained from Enschedé and Son, Haarlem.

DR. G. F. MARTINEAU, of Yorke House, Stourport, writes with reference to the article "On the Origin of our Potato," in *NATURE* of May 6 last, p. 7, that in turning over, the other day, the leaves of the sumptuous "Hortus Eystertensis" of Basil Besler, printed in Nuremberg in 1613, he found an excellent plate of the plant (of which he sends a tracing), with a clear and full description. Certainly it is quite worth while to draw attention to Besler's figure and text, but it tells one nothing new. There are good figures in Gerarde, 1597, and Clusius,

1601, Besler's being 1613. "The potato," another correspondent writes, "is not wild in Virginia; it must have been carried there from Peru and Chili. The only wild United States potatoes are high up in the Rocky Mountains. A. De Candolle's idea is that the potato was first brought to Europe, not by the English, but by the Spaniards."

THE additions to the Zoological Society's Gardens during the past week include a Chimpanzee (*Anthropopithecus troglodytes* ♀) from West Africa, presented by Capt. Reginald E. Firminger; a Rhesus Monkey (*Macacus rhesus* ♂) from India, presented by Mr. G. Ballentyne; a Macaque Monkey (*Macacus cynomolgus* ♀) from India, presented by Mrs. S. M. Grove-Grady; a Banded Ichneumon (*Herpestes fasciatus*) from West Africa, presented by Mr. G. F. Stimpson; two Egyptian Geese (*Chenalopex aegyptiaca*) from Africa, presented by Col. Harris Burland; a Larger Hill-Mynah (*Gracula intermedia*) from India, presented by Miss Maud Bendall; a Martinique Gallinule (*Zonornis martinicus*) from South America, presented by Mr. W. J. Rae; Aldrovandi's Skin's (*Plestiodon auratus*) from North-West Africa, presented by the Hon. Walter de Rothschild; a Geometric Tortoise (*Testudo geometrica*), a Semiserrated Tortoise (*Testudo semiserrata*), an Angulated Tortoise (*Chersina angulata*), two Dwarf Chameleons (*Chameleon punilus*), two Keeled Euprepes (*Euprepes carinatus*), a Spotted Slowworm (*Aconias meleagris*), a Bipes (*Scelotes bipes*) from South Africa, presented by the Rev. G. H. R. Fisk, C.M.Z.S.; a Sand Lizard (*Lacerta agilis*), European, presented by Master Stanley S. Flower; two Ruffs (*Machates pugnax*), a Common Viper (*Vipera berus*), British, deposited; a Silver-backed Fox (*Canis chama*) from South Africa, twelve Black-tailed Godwits (*Limosa algocephala*), European, purchased; a Thar (*Capra jemlaica*), a Pigmy Hog (*Forcula salvania*), twelve Mandarin Ducks (*Aix galericulata*), a Chilian Pintail (*Dafila spinicauda*), a Red-crested Pochard (*Fuligula rufina*), bred in the Gardens.

#### OUR ASTRONOMICAL COLUMN

BLACK TRANSIT OF JUPITER'S FOURTH SATELLITE.—The fourth satellite of Jupiter was observed in black transit by Mr. E. E. Barnard of Nashville, Tenn., U.S.A., on May 8 with a 6-inch refractor. It was first noticed as a black spot at 9h. 20m. local mean time. Some little time previous to this it had been looked for on the disk but could not be seen either as a white or dark spot. The satellite was followed until 9h. 43m., and was then very black and rather small and round when best seen.

COMETS BROOKS I. and III.—The following ephemeris for Comet Brooks I. is by Dr. A. Berberich (*Astron. Nachr.*, No. 2731):—

1886	R.A.			Decl.		Log <i>r</i>	Log Δ	Bright- ness
	h.	m.	s.	°	'			
July 3	8	11	33	8	43'6 S.	9'8945	0'1128	2'0
7	8	37	32	9	49'2	9'9405	0'1400	1'4
11	9	0	24	10	37'4	9'9811	0'1680	1'0
15	9	20	32	11	13'6	0'0172	0'1957	0'8
19	9	38	22	11	41'5	0'0498	0'2227	0'6
23	9	54	15	12	3'9	0'0794	0'2487	0'5
27	10	8	30	12	22'7	0'1064	0'2734	0'4
31	10	21	25	12	39'1 S.	0'1314	0'2969	0'3

The brightness on April 29 is taken as unity.

Comet Brooks III. is now very faint, and will be soon altogether out of sight. Dr. S. Oppenheim gives (*Astron. Nachr.*, No. 2735) the following places for Berlin midnight on July 4 and 8:—

	h.	m.	s.	Decl.
July 4, R.A.	13	18	40	16° 42'6 S.
8,	13	29	17	18° 48'3 S.

NOVA ORIONIS.—The new star discovered by Mr. J. E. Gore near  $\chi_1$  Orionis appears for some unexplained reason to be a difficult object for photometric observations, the estimates of its magnitude made by various observers differing remarkably. Thus Dr. G. Müller found it a little brighter than the 6th magnitude

in the last days of December 1885—December 19, 5<sup>h</sup> 86 m.; December 20, 5<sup>h</sup> 76 m.; December 30, 6<sup>h</sup> 00. Profs. Glasenapp and Pritchard both found it considerably fainter than the 6th at this time, the former giving it as 6<sup>h</sup> 7 m. on December 30, the latter 6<sup>h</sup> 42 m. on December 23. Profs. Müller and Pritchard give closely accordant results for the middle of January 1886, the magnitude being about 6<sup>h</sup> 8 m., whilst Prof. Glasenapp and Mr. Gore found it about 7<sup>h</sup> 3 m. at the same time. Profs. Pritchard and Müller disagree a little later on, and differ by a full magnitude at the end of February and beginning of March, the former regarding the star as about the 7th magnitude, the latter about the 8th, whilst MM. Glasenapp and Gore consider it as nearly the 9th. There is a better agreement amongst three of the observers as to the range of magnitude through which the star has passed; Dr. Müller and Mr. Gore, agreeing in giving 2<sup>h</sup> 4 m. for the change from about December 20 to March 8, and Prof. Glasenapp finding nearly the same value, but Prof. Pritchard, on the other hand, only finds a change in the same period of about seven-tenths of a magnitude.

IO SAGITTÆ.—Mr. Espin, in *Circular* No. 5 of the Liverpool Astronomical Society, gives the interval from maximum to minimum for this star as 4<sup>h</sup> 4d.; maxima for July, 1<sup>h</sup> 6d., 9<sup>h</sup> 9d., 18<sup>h</sup> 3d., 26<sup>h</sup> 6d.; minima 6<sup>h</sup> 1d., 14<sup>h</sup> 4d., 22<sup>h</sup> 7d., 31<sup>h</sup> 0d.

### ASTRONOMICAL PHENOMENA FOR THE WEEK 1886 JULY 4-10

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

#### At Greenwich on July 4

Sun rises, 3h. 52m.; souths, 12h. 4m. 6<sup>h</sup> 4s.; sets, 20h. 16m.; decl. on meridian, 22° 53' N.: Sidereal Time at Sunset, 15h. 7m.

Moon (three days after New) rises, 7h. 7m.; souths, 14h. 36m.; sets, 21h. 53m.; decl. on meridian, 13° 19' N.

Planet	Rises h. m.	Souths h. m.	Sets h. m.	Decl. on meridian
Mercury ...	5 42	13 39	21 36	20° 33' N.
Venus ...	1 36	9 24	17 12	19° 13' N.
Mars ...	11 14	17 16	23 18	0° 23' S.
Jupiter ...	10 53	17 6	23 19	1° 44' N.
Saturn ...	3 53	12 2	20 11	22° 30' N.

July	h.	
4 ...	2	Saturn in conjunction with the Sun.
7 ...	7	Jupiter in conjunction with and 0° 33' south of the Moon.
7 ...	13	Mars in conjunction with and 2° 1' south of the Moon.

#### Variable Stars

Star	R.A. h. m.	Decl. ° ' N.	July	h. m.
U Cephei ...	0 52 <sup>2</sup>	81 16	July	4, 0 33 <i>m</i>
Algol ...	3 0 <sup>8</sup>	40 31	"	9, 0 13 <i>m</i>
R Bootis ...	14 32 <sup>2</sup>	27 14	"	5, 3 16 <i>m</i>
δ Libræ ...	14 54 <sup>9</sup>	8 4	"	8, <i>M</i>
U Coronæ ...	15 13 <sup>6</sup>	32 4	"	10, 22 40 <i>m</i>
S Herculis ...	16 46 <sup>7</sup>	15 8	"	8, 2 57 <i>m</i>
R Ophiuchi ...	17 1 <sup>2</sup>	15 56	"	4, <i>m</i>
U Ophiuchi ...	17 10 <sup>8</sup>	1 20	"	4, <i>M</i>
X Sagittarii ...	17 40 <sup>4</sup>	27 47	"	7, 0 40 <i>m</i>
β Lyræ ...	18 45 <sup>9</sup>	33 14	"	10, 2 0 <i>M</i>
			"	9, 21 30 <i>M</i>

*M* signifies maximum; *m* minimum.

### NATIONAL SMOKE ABATEMENT INSTITUTION<sup>1</sup>

DURING the year the interest in the subject of smoke prevention and in improved apparatus for the consumption of fuel has been steadily increasing, and the gradual extension of knowledge on the subject has led the general public to take a much more intelligent and active interest in the question of smoke abatement, which was at first considered by the great majority of the community to be almost a sentimental evil rather than a matter entering into the calculation and care of ordinary

<sup>1</sup> Report of Council of the National Smoke Abatement Institution, submitted at the ordinary general meeting, December 18, 1885.

life. The Council regret, however, to note that the Annual Report of the Commissioner of Police, issued in August last, is strangely deficient with regard to information as to the operation of the Metropolitan Smoke Abatement Acts, which are administered by the police; and the Council thought it their duty to write to the *Times* and other daily papers, calling attention to this want of information in the Report, and also to the very anomalous character of the fines inflicted in the case of convictions; they also laid the matter before the Home Secretary, calling special attention to the following facts—

(1) That in numerous cases of nuisance which are reported by the police no proceedings are taken.

(2) That when proceedings are instituted, and convictions obtained, the penalties inflicted by the magistrates do not comply with the Acts of 1853-56, the average fine being below the legal minimum.

(3) That no proceedings whatever appear to be taken to enforce the abatement of smoke from steamers, &c., on the River Thames, although an enormous quantity of smoke is evolved by them, causing a very serious nuisance, not only in the waterside districts, but by polluting the general atmosphere of the metropolis.

(4) That such great development has taken place during the last few years in the methods of preventing smoke from the works falling under the provisions of the statutes, that they may be more rigidly enforced without hardship.

(5) That the area within which the Smoke Abatement Acts apply no longer corresponds with the area within which smoke is produced.

The Council were supported in thus calling the attention of the Home Secretary to the matter, by the fact that the Annual Report of the Commissioner of Police for the preceding year (1883) remarks strongly on the inadequacy of the fines, and states that, "The fact of recent changes in heating systems having brought about some very considerable commercial advantages of various kinds, has operated in a marked degree in mitigating hostility to the enforcement of the Acts."

The Council have also, through the medium of the Press, called attention to the fact that the London School Board are neglecting a public duty and losing a valuable opportunity of instructing the public, by having the large buildings recently erected for schools fitted up with heating apparatus without due regard to their smoke-consuming capabilities.

They have also endeavoured to influence public opinion by bringing under notice pledges which appear to have been given by some Parliamentary candidates, that they would endeavour to exempt bakers from the operation of the Smoke Abatement Acts, this pledge having been obtained by certain bakers who wished to maintain the use of a particular class of furnaces which ordinarily produce a large amount of smoke. It is scarcely necessary to point out that the exemption of bakers from the operation of the Smoke Nuisance Acts would be prejudicial to the public interest, as it is a fact that smoke can be and is in some bakeries entirely prevented, not only to the advantage of the public, but also to that of the men who work in the bakeries. The Parliamentary candidates themselves were also communicated with upon the subject.

The unreasonableness of the suggestion that bakers should be exempt from the provisions of the Smoke Acts is the more noticeable from the fact that the Commissioner of Police, in his Annual Report for 1883, alluding to the general improvement of heating methods, says: "The most important changes perhaps have been made in the case of bakers' and confectioners' oven furnaces, which have hitherto caused, and still continue to cause, the greatest number of offences charged under the Smoke Acts. Some of them are now adapted by a simple alteration, which can be made without stoppage of the daily trade, to the use of gaseous fuel (ordinary coal gas mixed with atmospheric air), instead of coal; while other ovens are heated by coke applied either directly to the purpose, or by steam, which is generated in pipes heated by means of coke-fired furnaces."

It may be added that the Council have had before them an offer from a good firm of oven builders, stating that they are prepared to fit up fifty bakers' ovens at half price, to prove the practical working of one system rendering such ovens entirely smokeless.

In various trades, notably baking confectionery, tile and porcelain burning, glass staining, japanning, &c., considerable advantages, in addition to the prevention of smoke, have been found to result from the use of coal gas instead of solid fuel for